United States Department of Agriculture
Natural Resources Conservation Service

Fence

Woven Wire

Virginia Conservation Practice VA Job Sheet Code 382(b)

Definition

A constructed barrier to livestock, wildlife or people.

Purpose

This job sheet is provided as a component of a resource conservation plan. This practice may be applied to contain and control livestock and wildlife movement, facilitate a prescribed grazing system, protect sensitive areas from grazing livestock, and to eliminate access to unsafe areas.

Conditions where practice applies

This practice may be used on any area where a fence is needed to control access, movement and containment of livestock and wildlife and where people safety and movement is of concern. This job sheet is provided as a component of a resource conservation plan. Conservation plan maps showing the approximate fence location, complementary conservation practices, grazing schedule, other relevant information, and additional specifications may be included.

General Criteria and Specifications

All fence construction shall comply with federal, state, and local fencing codes.

Fence line clearing

Fence lines will be cleared of brush and trees; gullies and steep banks may require grading. Clearing along stream banks will be held to a minimum and no vegetation may be removed within the buffer area, except as required for stream crossings.

Fencing materials shall be of a quality and durability that meets the intended management objectives. Construction shall be performed in a manner that meets the intended management objective. Wire and hardware will be new, galvanized material.

Line post

Maximum spacing between posts is 16.5 feet. All wooden line posts shall be set at least 24 inches into the ground.

Suitable line posts

3½" in diameter wooden posts of black locust, red cedar (mostly heartwood), redwood, and pressure treated pine or other wood of equal life and strength. Pressure treatment shall meet the requirements for ground contact.

Note: Landscaping timbers should not be used for post or brace assemblies.

Steel posts must be new and be painted or galvanized and weigh a minimum of 1.25 pounds per one foot of length. Post will be driven 18" inches in the ground or as specified by manufacturer. Every 50 feet or 4th post will be wooden.

The following steel posts are acceptable for line posts:

Style 1 – "T" Section 1- 3/8" x 1-3/8" x 1/8" thick
Style 2 – "U" Section 2" x 1-1/4" x 3/32"
Style 3 – "L" Section 2" x 2" x ¼"

Lightweight stamped-steel posts are not allowed.

Brace post: Posts shall be set and maintained in a vertical position. All wooden brace posts are to be 5" minimum diameter and set 3 feet into the ground. Horizontal rail brace posts are to be 4" minimum diameter by 8 ft. long and be installed 8" – 12" below the top of the vertical brace post.
Note: Landscaping timbers should not be used for post or brace assemblies.

Corners and braces: Refer to drawings on pages 7-9 for fence brace configurations and spacing.

Single H Braces: Single H Brace corners and end braces may only be installed at the ends of straight fence spans of 165 feet or less.

Double H Braces: All corners, fence line ends and gate openings require Double H Brace assemblies, except that Single H Braces may be substituted in straight fence spans of 165 feet or less.

Double H Brace Pull Assemblies: Double H Brace pull assemblies are required in straight fence spans at a maximum spacing of 660 feet.

Brace wire shall be high tensile, galvanized steel, or 9 gauge soft wire.

Adjoining Fences: A fence adjoining an existing fence must terminate in a brace assembly as required above.

Corners: A bend in the fence tighter than 20 degrees is considered a corner and not a "straight" pull brace. (In an 8-foot long brace section, 20 degrees is approx. 3 feet off the straight line. Refer to drawings). The above H brace rules apply to corners considering each wire-pull direction from the corner post. Combination single and double H corners are permitted.

If hand set, all backfilled material shall be thoroughly tamped in 4" layers. Post holes shall be at least 6" larger than the diameter or side dimension of the posts. Synthetic posts are to be installed as specified by the manufacturer.

If concrete backfill is used, the concrete must be pre-mixed, and worked into place up to the ground surface. No stress shall be applied to posts set in concrete for at least 24 hours after the concrete has set.

Wire

Wire shall have a minimum Class 3 zinc coating and shall meet the requirements of ASTM A116 or Class I zinc coating with 0.27 ounces of zinc per ft^2 meeting the requirements of ASTM A116.

For Cattle, fencing shall be 1047 woven wire, which has 10 line wires, with stays (the vertical wires) on 9" spacing. Top and Bottom line wires shall be at least 10 gauge (medium weight) and the filler wires (the remainder of the fence wires) will be a minimum of 12½ gauge.

For Horses, use "square knot mesh" which has 2" horizontal by 4" vertical openings, or "V-mesh" (diamond mesh) style horse fencing with triangular openings 2" wide by 4" tall. The mesh must be fastened by wire wrapping with no sharp wire ends. Horse fences should be 47" to 50" high. Horizontal wires must be12½ gauge steel, or 14 gauge high tensile. Vertical wires are to be at least 14 gauge steel.

For other Animals, a mesh and fence height that is appropriate to the species as recommended by the manufacturer.

High tensile woven wire 12½ gauge may be used for all animals as specified by manufacturer.

Welded mesh is prone to failure, and therefore is not recommended or allowed.

Fence top Deterrent
Barbed wire: At least one strand of barbed wire is to be placed no more than 6" above the woven wire. Additional strands may be added above the first at the same spacing. The barbed wire shall consist of 2 strands of wire with class 3 galvanized 4-point barbs spaced not more than 5" apart. Galvanized barbed wire shall be fabricated from 12½ gauge class 1 galvanized or high tensile class 3 barbed 15½ gauge galvanized strand wire or meeting the requirements of ASTM A121.
Barbed wire should not be electrified.

Electrified Wire: In lieu of barbed wire, the same number of 12½ gauge galvanized wires may be installed electrified on the spacing needed for barbed wire. The wire must be mounted and energized as required by the high tensile electric fence job sheet. Electric and barbed wire fence top deterrents may not be combined.

Wood Rail: A wood top rail may be installed no more than 6" above the woven wire to strengthen the fence in lieu of top wires, or a single electric wire with stand-off insulators may be included. The fencing may be stapled to the rail for added stiffness. With top rails, no post bracing assemblies are needed, but gate posts must be 5" in diameter and be set 3 feet in the ground.
Note: Landscaping timbers should not be used for post or brace assemblies.

Wire placement
Fencing and top deterrent (barb wire) should be installed according to Figure 3.

Stretching wire
Woven wire shall be stretched tight with no sags or waves in the material when viewed along the fence line. Wire at the end posts and corner posts shall be wrapped and attached to itself with 3 twists.

For barbed wire at the fence top, pull taut. A stretch of 100 feet (prior to attachment to posts) should sag no more than in the middle 4" in warm weather and not more than 2" in cold weather.

Attaching fencing to post
The fencing wire shall be placed on the livestock side of line posts and on the outside of corners and posts in bends and braces in bends.

Woven wire fencing shall be attached to post on alternate horizontal strands as a minimum. Each strand of barbed wire used shall be attached to each post using a 9-gauge galvanized 1½" staple driven diagonally

with the grain of the wood and at a slight downward angle (except in dips). Staples shall be driven tight to the post.

Fasten fencing to steel line post with either two turns of 14 gauge galvanized steel wire or the post manufacturer's special wire clips.

Wire shall be spliced with a figure-eight knot, or twisted with 8 wraps of each end about the other (western union splice), or by suitable splice sleeves applied with a tool designed for the purpose.

Other Considerations

Fences across gullies or streams require special braces and design. Breakaway fences or swinging water gaps allow debris and water to flow past the fence line without destroying the adjacent fence.

Any permanent fencing for grazing livestock should allow flexibility to facilitate implementation of the grazing plan and permit land management activities such as nutrient application, pest control, forage harvest, and other appropriate practices.

Follow all manufacturers' safety precautions for handling and installing fencing materials.

Locate fences to facilitate maintenance. Where applicable, clear right of ways should be established and maintained to facilitate fence construction and maintenance.

When possible, install fences across slopes to improve grazing distribution, rainfall infiltration, and reduce soil erosion.

Locate fences to facilitate livestock management, handling, watering, and feeding.

Consider placing permanent riparian stream fencing at the edge of the protected buffer or at least 2 times the active channel width from the top of the stream bank but never less than 10 feet. It is recommended that the stream fence have a maintenance gate installed. Woven wire fencing is not recommended for use in riparian areas due to flooding damage.

Approved alternative fence systems include "Common Sense Fence" or equivalent. Other fencing systems may be approved by an NRCS Area Resource Conservationist (ARC), and installed to manufacturer's recommendation as approved by Area ARC.

Alternative fencing and bracing systems: Alternative fencing and bracing systems must be pre-approved by an NRCS Area Resource Conservationist (ARC), and must be installed according to manufacturer's recommendations as approved by the ARC.

Specifications

Site-specific requirements are listed on the specifications sheet. Additional provisions may be contained in the conservation plan or other acceptable form of documentation. Specifications are prepared in accordance with the NRCS Field Office Technical Guide. See Conservation Practice Standard *Fence* (382)

Client:	**Farm #:**
Field(s):	**Tract #:**
Planned By:	**Location:**
Date:	**Length of Fence:**
Landowner Objectives:	

Purpose (check all that apply)	
☐ Reduce erosion and improve water quality by controlling livestock access to streams, springs, wetlands, and ponds.	☐ Protect sensitive environmental areas and the flora from vehicular, pedestrian, or animal traffic use.
☐ Protect newly planted areas from disturbance until established.	☐ Protect the safety or people, livestock, and wildlife by limiting or denying access to hazardous areas.
☐ Facilitate handling, movement, and feeding of livestock in the pasture environment.	☐ Improve distribution and timing of livestock grazing.
☐ Other (specify)	

Type of Fence - Woven Wire

Fence Height: _____ inches Number of wire: _____ Wire spacing: _____inches

Woven Wire Type: _____

Top Deterrent Type:_____

Posts		
Type Black Locust **OR** Eastern red cedar **OR** pressure treated pine or other preservative treated wood ***** **OR** standard steel line posts every 50 feet or w/4th post being a wooden post	**Size** Line posts are wood 6½ feet or longer 4" minimum diameter **OR** Standard steel line post $1^3/_8$ "x $1^3/_8$" x $^1/_8$ ", with anchor plate	**Spacing** Wood line posts spaced a maximum of 16½ feet apart set 2 feet deep minimum **OR** Steel line posts spaced a maximum of 16½ feet apart set to top of anchor plate or 18"

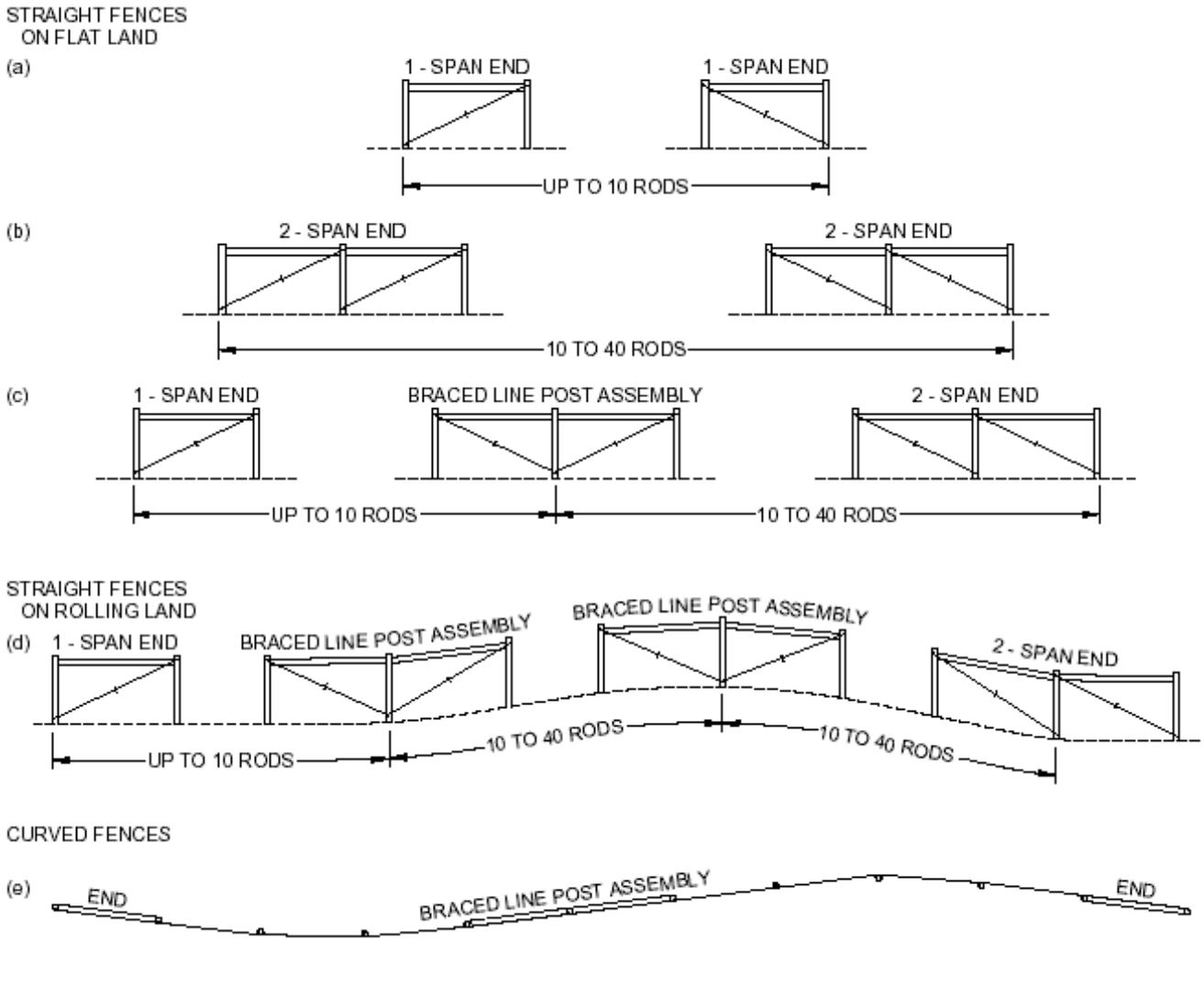
Braces	
Wooden Braces (8 feet minimum length) 4" diameter at small end *****	**Brace Wire** High Tensile, Galvanized Steel, 9 Gauge **OR** 12½ Gauge High Tensile, Galvanized, Double Wrapped

***Landscaping timbers should not be used.**

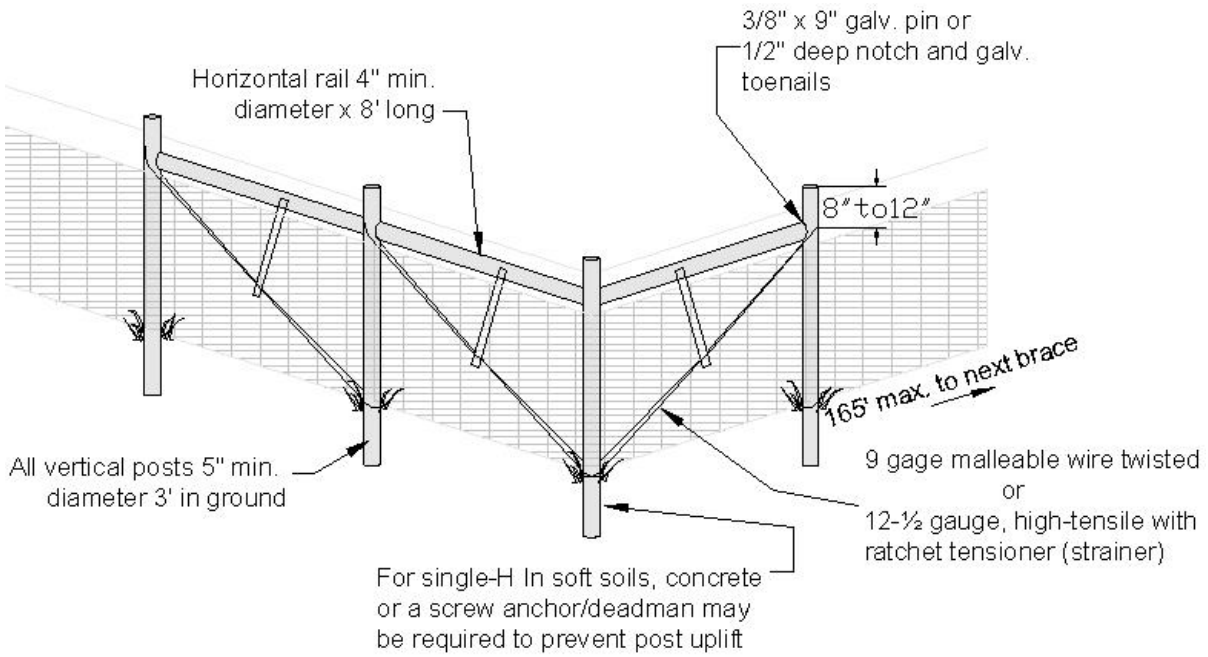
Operation and Maintenance
Inspections and maintenance are required to achieve the intended function, benefits, and life of the practice. The landowner/operator is responsible to establish and implement an inspection and maintenance program. Regular inspection of fences should be part of an ongoing maintenance program. Items to inspect and maintain during the 20-year design life of the practice include, but are not limited to, the following: 1. Inspection of fences after storm events is necessary to ensure the continued proper function of the fence. Promptly repair or replace damaged or broken fencing. 2. Retain and properly discard all broken fencing material and hardware to prevent ingestion by animals or injury to equipment, people, or animals. 3. Remove debris collected in the fencing. 4. Clear the brush from fence lines to reduce voltage loss. Vegetative control can be achieved by herbicides applied per the manufacturer's label. 5. Remove fallen limbs and maintain proper tension on the fence wires. Overhanging trees and limbs should be trimmed or removed as needed. 6. Maintain proper tension on the fence wires. 7. Follow your grazing plan, where appropriate. 8. All necessary precautions should be taken to ensure the safety of construction and maintenance crews.
Other:

For information regarding this practice contact:

_____ **at** _____.

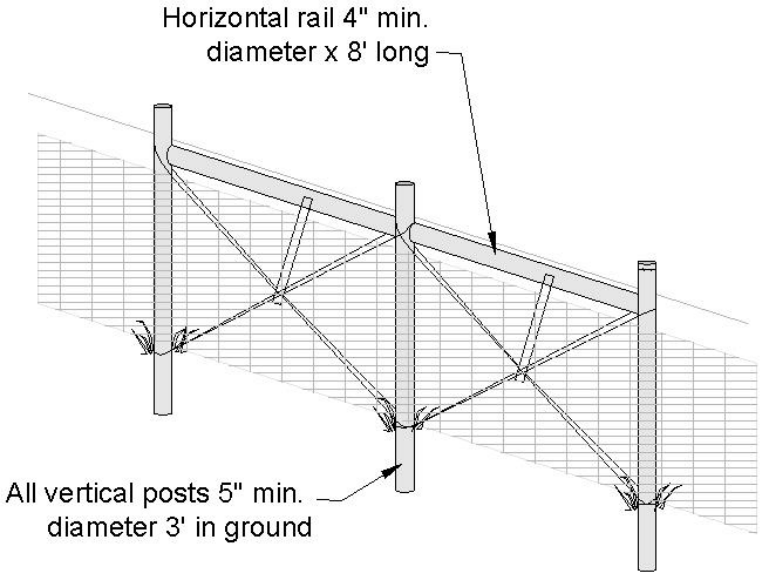


Types of anchor-and brace assemblies and where to locate them: (a) For fence lengths of 10 rods (165 feet) or less, use single-span end construction. **(b)** For fence lengths of 10 to 40 rods (165 to 660 feet), use double span end construction. **(c)** For fences more than 40 rods (660 feet) long use a braced-line-post assembly to divide the fence lengths. **(d)** On rolling land, fence stretching is easier if braced line-post assemblies are located at the foot and top of each hill. **(e)** Contour fences, more than 20 rods (330 feet) long, should have a braced-line-post assembly installed to keep the stretches to 20 rods (330 feet) or less. Install in straight section at least one post span away from a curve. Do not install on a curve.
Note: One rod equals 16½ feet.



Typical Combination Corner Brace Assembly

Figure 1



Double - H Brace Pull Assembly

Figure 2

SUGGESTED SPACING FOR BARBED WIRE

MOUNTING HEIGHTS FOR BARBED WIRE USED WITH WOVEN WIRE FENCE

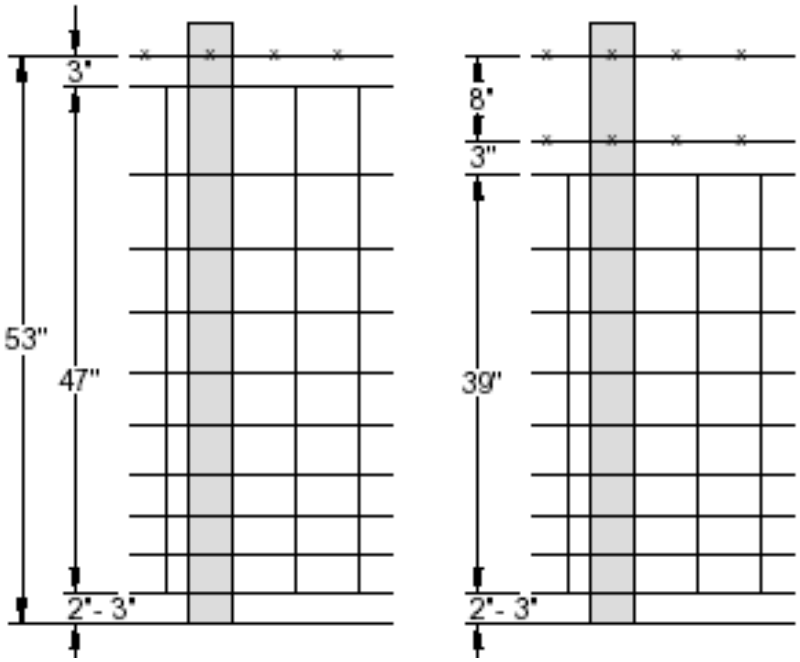
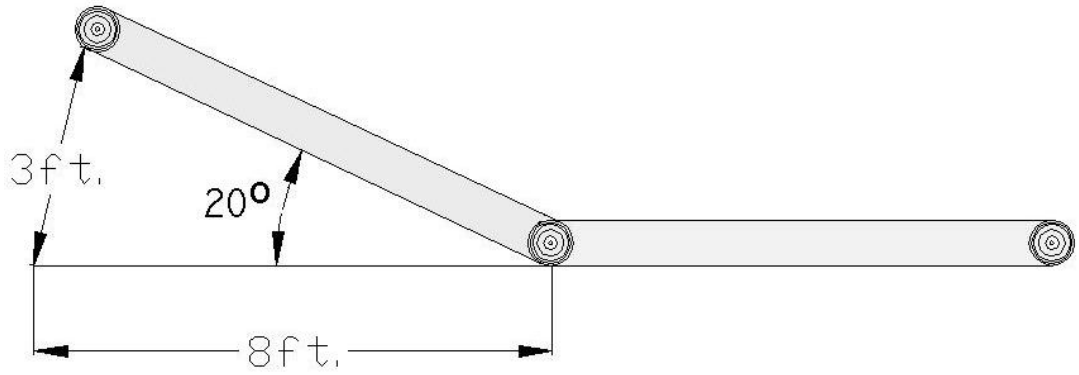


Figure 3

The first barbed wire above woven wire fence should be within 3" of top line wire. This reduces the possibility of animals getting their head between woven wire and barbed wire, and mashing down the fence.



Top View of Fence Brace Showing Minimum Angle to be Considered a Corner

Figure 4